36TH CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc No. 32.

COSTON'S TELEGRAPHIC NIGHT SIGNALS, ETC.

LETTER

FROM

THE SECRETARY OF THE NAVY,

IN

Further response to a resolution of the House calling for information relative to the "Coston Telegraphic Night Signals."

JANUARY 15, 1861.—Referred to the Committee on Naval Affairs, and ordered to be printed

NAVY DEPARTMENT, *January* 4, 1858.

GENTLEMEN: You are hereby appointed a board to examine and test the "Coston signals," and to report to the department your opinion of their merits in comparison with others with which you are acquainted. Mrs. Coston will furnish you with a set of them, and give any explanation that you may desire.

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Commodore CHARLES S. MCCAULEY,
Commander JOHN RODGERS,
Lieutenant HENRY H. LEWIS,
Washington, D. C.

WASHINGTON, *January* 27, 1859.

SIR: In compliance with your order of the 4th instant, the undersigned board of officers has examined and tested the "Coston signals," and respectfully report to the department that it is its opinion that their merits as night signals, in comparison with others with which the board is acquainted, are decidedly superior.

In performing this duty the board has availed itself of different stages of the atmosphere, in order to render the examination and test as thorough as possible.

We have the honor to be your most obedient servants,

CHARLES S. MCCAULEY,
Captain and senior officer.
JOHN RODGERS,
Commander U. S. N.
HENRY H. LEWIS,
Lieutenant U. S, N.

HON. ISAAC TOUCEY,
Secretary of the Navy.

NAVY DEPARTMENT, *January* 31, 1859.

SIR: The department has received the report, dated the 27th instant, of the board of officers appointed to examine and test the "Coston signals."

The board will be pleased to make a detailed report of the examination and test and state to the department—

1st. Whether the "Coston signals" are better than any others known to them.

2d. Whether they would recommend them for use in the navy; and

3d. The reasons for their conclusions or recommendations.

I am, respectfully, your obedient servant,

ISAAC TOUCEY.

Commodore CHARLES S. MCCAULEY,
Senior officer of the board, Washington.

WASHINGTON, D. C., *February*, 1859.

SIR: In obedience to your order of the 31st ultimo, the board of officers ordered to examine and test the Coston signals have the honor unanimously to report:

1st. That the Coston signals are better than any other known to them.

2d. That the board strongly recommend them for the use of the navy.

3d. In stating their reasons for the conclusions or recommendation to which they have arrived, it may not be out of place to say that signals being the means whereby orders are given, or wants made known at sea, a good code of them plainly intelligible to the persons addressed is absolutely necessary to the efficient conduct of a fleet. In the navy two signal books are used, one called simply the "Signal Book," the other the "Telegraphic Dictionary." A peculiar flag designates when the telegraphic dictionary is to be employed; without this flag the meaning is to be sought in the signal book. The signal book consists of all the sentences, arranged alphabetically, which would occur in ordinary service, numbered, consecutively, from 1 to about 1,300. The telegraphic dictionary has an alphabet and the words of the language, numbered from one to the end of the book, whereby an unusual name may be spelt by the alphabet, or any ordinary word designated by its proper number in the dictionary. By means of the numerical values attached to the signal flags, the ship makes the number attached to the sentences or words in the signal books; and thus communications of any nature are mutually made between vessels. But in practice at night it has been found so difficult to make clear and distinct combinations of lights, that the books in use by day were thrown aside; and a set of night signals were arranged in a separate code, of little extent, and of uncertain determination.

The Coston signals consist of a colored firework, or a combination of not more than three colors, contained in a small paper box; and they designate, by the order of the colors burnt, the number to be understood. The application of the "Coston night signals" to the navy day signal books gives a perfect code of night signals. They offer precision, fulness, and plainness, at a less cost for fireworks than it is thought we now pay for confusion and uncertainty.

Very respectfully, your obedient servants,

C. S. McCAULEY,
Captain and senior officer.
JOHN RODGERS,
Commander U. S. N.
HENRY H. LEWIS,
Lieutenant U. S. N.

Hon. ISAAC TOUCEY,
Secretary of the Navy.

We append the following synopsis from the record of our proceedings:

JANUARY 13, 1859.

"Commander Rodgers proceeded at dark to the Virginia side of the causeway of the Long Bridge, and burnt the following signals." The record then contains the burning of ten Coston lights. These lights were observed from the office, at the corner of F and 19th streets. At the office the order of burning these signals was not known, but the signals were seen perfectly, and were recognized in the order in which they were burnt by Commodore McCauley and Lieutenant Lewis at the office. The test this night was entirely satisfactory for the Coston signals. Then follows a record of burning navy signals, which were not recognized. The navy blue lights were mistaken for white lights; they were sometimes ignited only after repeated failures of the caps. From the office Nos. 3, 5, 9, and 4 Coston lights were burnt; No. 4 was not seen. It having been agreed to fire three only from the office, the fourth was not looked for, and the party on the bridge, in getting their things together, may have failed to see it from inattention rather than its indistinctness; and 3 was read as 6 on the bridge. There is an uncertainty in the record as to whether the number burnt was actually 3 or 6. The moon, during the trial, was about three-quarters full; it shone through mist and clouds, a few stars visible overhead. A thick mist obscured all the lights in the city, except two gas-burners near the President's mansion. Distance between points of observation about $1\frac{3}{4}$ mile.

SATURDAY EVENING, *January* 14, 1859.

Lieutenant Lewis proceeded to the United States arsenal and burnt the following signals: 1 rocket; then follow 18 Coston signals, answered from the office 3 Coston signals; then follow 12 navy lights;

then follow 3 Coston signals. Distance from office, in F street, to United States arsenal, about 2½ miles. The Coston signals, from the arsenal, were perfectly clear and distinct. In every case they were read without hesitation, and the records at the office and at the arsenal agreed perfectly. The navy lights were not so good. The white navy lantern was seen, but, even with a spy-glass, the red lantern was invisible. The navy lights, in some cases, were not ignited until after several caps had been snapped. In every case, however, the character of the navy lights was recognized. The night was perfectly clear, with a nearly full moon.

The test of the Coston signals was satisfactory, and confirms the experience of the previous trial.

WEDNESDAY EVENING, *January* 19, 1859.

Commander Rodgers proceeded to the United States arsenal, and at dark burnt the following signals: 1 rocket; then follow 11 Coston signals, which were entirely successful. A number of navy lights were then burnt. The whites, blues, and greens were not to be distinguished with any certainty, but the reds were beautiful. Two navy lights were blown from the holders, and sometimes several caps were necessary to their ignition. From the arsenal and from the office the same difficulty was found with the navy lights.

WEDNESDAY EVENING, *January* 26, 1859.

In consequence of waiting for a further supply of Coston lights from New York, no experiments were made until this night.

Lieutenant Lewis made 23 Coston signals to the office from the banks of the Potomac, opposite Alexandria—distance about 8½ miles—which were answered from the office by 9 Coston lights. The result was satisfactory. It was found, however, that the Coston green was much more feeble than the white, and the white rather feebler than the red.

These signals were nearly all read distinctly at the distance of about 8½ miles, in a very unfavorable state of atmosphere, the night being misty. At the first part of the trial the navy white lantern was seen, but towards the close it was invisible.

Respectfully, your most obedient servants,

C. S. McCAULEY,
Captain and senior officer.
JOHN RODGERS,
Commander U. S. N.
HENRY H. LEWIS,
Lieutenant U. S. N.

WASHINGTON, *March* 11, 1859.

DEAR SIR: After due consideration, I have concluded to furnish the Coston marine night signals, for the use of the United States navy, at the following named prices:

The common size for *ordinary* use and general purposes, at a cost not exceeding four dollars ($4) per set of twelve pieces.

The large size for extraordinary occasions, great distances, distress, &c., at the sum of seven dollars ($7) per set. The boxes, slate pencils, directions for use, and holders, will not exceed the sum of fifty cents (50 cts.) per set; and when once supplied with slates, pencils, holders, and directions for use, will not need renewing until worn out or lost by accident.

In sending this estimate to the honorable Secretary, I will take the liberty of stating that the signals furnished at the present time will cost almost twice the amount they will hereafter, when the manufacturer shall have proper machinery and well-instructed hands employed in their construction. I greatly desire that these things may be taken into consideration, so that the prices will not weigh against their general adoption in the United States navy.

I have the honor to be, most respectfully, your obedient servant,

MARTHA J. COSTON.

Hon. ISAAC TOUCEY,
Secretary United States Navy.

BUREAU OF ORDNANCE AND HYDROGRAPHY,
March 17, 1859.

SIR: I have the honor to return herewith the letter to the department from Mrs. Martha J. Coston, which was referred to me for an opinion.

From the very favorable report of the board who examined and tested Mrs. Coston's night signals, I would recommend that one hundred sets be purchased and distributed among the different squadrons, with directions to their commanders to have them fully tested, and to report if in their opinion they are superior to any night signals now in use, and whether it would be advisable to introduce them into the naval service.

The small or common size, at $4 per set, will answer for experimental purposes.

With much respect, I am, sir, your obedient servant,

D N. INGRAHAM,
Chief of the Bureau.

Hon. ISAAC TOUCEY,
Secretary of the Navy.

NAVY DEPARTMENT, *March* 19, 1859.

SIR: The department has concluded a bargain with Mrs. Martha J. Coston, for three hundred sets of the "Coston night signals," viz: 200 sets of the common size, at $4 per set of twelve pieces, and 100 sets of the larger size, at $7 per set of twelve pieces.

You will be pleased to inform her where she shall deliver them,

and when delivered, approve a bill for them, payable out of the appropriation for testing useful inventions.

Very respectfully, &c.,

ISAAC TOUCEY.

Captain D. N. INGRAHAM,
Chief of Bureau of Ordnance and Hydrography.

BUREAU OF ORDNANCE AND HYDROGRAPHY,
November 20, 1860.

SIR: I have the honor to transmit, herewith, copies of all the reports that have been received of the tests made with Mrs. Coston's night signals. It will be observed that these reports are very favorable; and as the signals are considered superior to any others heretofore used, the bureau would respectfully recommend their adoption in the navy in place of the night signals now in general use.

With much respect, I am, sir, your obedient servant,

G. A. MAGRUDER,
Chief of the Bureau.

Hon. ISAAC TOUCEY,
Secretary of the Navy.

FLAG SHIP "ROANOKE,"
Off Aspinwall, November 24, 1859.

SIR: Agreeably to your order of the 21st instant, we have tested the merits of the "Coston night signals," and find them, by comparison, infinitely superior to any others we have ever seen. On the evening of the 23d instant the "Preble" was anchored outside of the bay, at four sea miles distance from the Roanoke; there was a light haze in the atmosphere.

The small lights were first burned on board the "Preble," making five signals, all of which were distinctly and easily read with the naked eye. The large lights were next burned, making two signals, and were surprisingly distinct. Eight signals were then made from the "Roanoke" to the "Preble," with the same result, and without mistake or misunderstanding on either side.

In our opinion, these night signals are simple, perfect, and beautiful, and have all the requisites of forming a complete code.

More signals would have been exchanged between the ships, but their superiority and simplicity were so obvious from the very first that we thought it entirely unnecessary.

It is our opinion that, in clear weather, the small lights can be read from the deck of a frigate at 6 miles distance, and the large ones at 8 or 10 miles. Time will be necessary to show to what extent they

may suffer from the dampness incident to their use at sea and stowage on shipboard.

We are, with great respect, your obedient servants,

WM. H. GARDNER, *Captain.*
H. A. ADAMS, *Captain.*
THORNTON A. JENKINS, *Commander.*
R. D. MINOR, *Lieutenant.*

Flag Officer WM. J. MCCLUNEY,
Commander-in-chief Home Squadron.

Forwarded by Flag Officer W. J. McCluney, November 29, 1860.

UNITED STATES FLAG SHIP CONSTELLATION,
At sea, February 3, 1860.

SIR: In obedience to your order, dated Porto Grande, September 12, 1859, directing me to make a full and rigid test of the "Coston night signals," I report that I associated with myself James P. Foster, flag lieutenant of this ship, and that we have tested these signals on every occasion that offered, (four times,) and we now report that on every occasion that these signals were used that they were as easily made and more readily read than the day signals made by the flags. At the distance of four miles, in a dark night, they were read without the slightest difficulty.

The feeling and opinion of all the officers of this ship is that the Coston signals are as near perfection as night signals can be made.

We, the undersigned, never before saw night signals made that could be read or understood with facility until we met with the Coston signals. As to the ability of these signals to withstand the dampness incident to the sea, we can only state that they were shipped on board the San Jacinto on the 7th of July, 1859, and at this date, February 3, 1860, they appear to be in as good order as ever they were; and to sum up our opinions in a few words, we believe them to be superior to all signals now in use. The Coston signals, if adopted in the navy, will give to it a night signal fully equal, if not superior, to the day signals at present used.

Very respectfully, your obedient servants,

JOHN S. NICHOLAS, *Captain.*
JAMES P. PORTER, *Lieutenant.*

Flag Officer WM. INMAN,
Commanding United States African squadron.

Forwarded by Wm. Inman, flag officer commanding United States African squadron.

UNITED STATES FRIGATE CONGRESS,
St. Catharine's, Brazil, August 18, 1860.

SIR: In obedience to your orders, a course of experiments was conducted on the night of the 15th instant, with Coston's night signals, in order to ascertain their merits and fitness for adoption in the service.

They were made by this ship remaining at anchor, and the Bainbridge placing herself, with every available accuracy, first at a distance of $9\frac{2}{10}$ miles, then at $7\frac{2}{10}$ miles, and then at $5\frac{8}{10}$ miles. At each of these stations $19\frac{1}{3}$ of these signals on the average (or 58 at all three) were exchanged alternately, using the larger size for the first two stations, and the smaller size for the third. The signals were not preconcerted, and thus neither vessel had the slightest idea of those the other intended to make. The weather was lowering and sombre, with a light mist at intervals, and not a star could be seen in any direction, consequently it was not favorable for descrying distant objects of any sort. All the signals used had been on board of us some thirteen months, and kept during the whole time in an arm-chest on deck. Even under these circumstances there was next to no difficulty whatever in distinguishing every signal that was made; and each and all, so far from any failure in office, responded as readily to the application of the match, burnt as freely, and developed the intended colors as vividly and distinctly as though fresh from the laboratory. Indeed, questions were asked and answered, intentions conveyed, and orders communicated with a rapidity and certainty that astonished us all, and decidedly greater than the same could possibly have been accomplished by day with the usual day signals, under similar conditions of distance, calmness of wind, and position of vessels with reference to each other. In fact, from what I witnessed, it occurs to me as more than probable that, as a general thing, vessels provided with Coston's signals may communicate with each other better by night than they now can by day with numeral flags.

Thus far, therefore, I am induced to regard these signals as eminently calculated to afford a very convenient and most happy solution of the embarrassing, and, at times, dangerous difficulties under which we have hitherto labored in the way of night signals for the want of a better system.

Whether these night signals of Coston's are at all liable to spontaneous combustion, or whether they are likely to deteriorate so as to unfit them for reliable use in the course of a long cruise, I should prefer, at present, not to venture an opinion; but unless they be open to these objections in a serious degree, I would hail their introduction into the service, with the entire suppression of the existing mode of communicating at night, with unfeigned delight, and as a great and lasting benefit to our navy. It is proper to add that, up to this time, I have no particular reason to suppose that they are at all more liable to spontaneous combustion than the other fireworks placed on board our ships; and on the score of deterioration, I have stated above the result of our observations, after having kept the signals on deck in an ordinary arm-chest for upwards of one year.

At the end of another year or so I hope to have an opportunity of trying them again; and, in the meantime, also, with your consent, I will continue the experiments every now and then, at suitable intervals, and keep you duly advised of results.

Very respectfully, your most obedient servant,

L. M. GOLDSBOROUGH, *Captain.*

Flag Officer J. R. SANDS,
Commanding Brazil Squadron, Flag-ship Congress.

Forwarded by—
Most respectfully,

JOSHUA R. SANDS.
Flag Officer Brazil Squadron.

BUREAU OF ORDNANCE AND HYDROGRAPHY,
August 9, 1859.

SIR: An inquiry having been made as to the expediency of placing in the magazines of vessels the "Coston night signals," you are requested to inform this bureau if there is anything in the component parts of said lights which would render them liable to spontaneous combustion, explosion, or to be set on fire by friction.

An early answer is desired.

Respectfully, your obedient servant,

D. N. INGRAHAM,
Chief of the Bureau.

Mr. GEO. A. LILLIENDAHL,
No. 62 *John street, New York.*

OFFICE 62 JOHN STREET,
New York, April 11, 1860.

DEAR SIR: Last August you made inquiry of me regarding the safety of the "Coston night signals" as to liability of spontaneous combustion, explosion, friction, &c. Enclosed please find copy of certificate from Professor R. Ogden Doremus, which I hope will be satisfactory. This gentleman (Doremus) has the reputation of being the best analytical chemist in the country, and is well known in Washington.

Mrs. Coston anticipating further orders from our government, no doubt the enclosed document will allay any apprehension of danger as to the safety of these lights.

Respectfully, your obedient servant,

G. A. LILLIENDAHL.

D. N. INGRAHAM, Esq.,
Chief of Bureau of Ordnance and Hydrog'y,
Washington, D. C.

NEW YORK MEDICAL COLLEGE,
March 16, 1860.

MADAM: At the request of Mr. G. A. Lilliendahl, I have witnessed at his pyrotechnical laboratory the mode of manufacture of the materials and compositions used by him in preparing your patent "night signal lights."

I have analyzed each of the ingredients, and, in experimenting, find that they are not deliquescent, nor when they are commingled are they liable to absorb moisture; the metallic cases also serve to guard the materials against accidental wetting.

The various chemicals, and other articles of which the "lights" are compounded, are not spontaneously combustible at common temperatures in their separate or combined states; and by employing heat through "an oil bath," I learn they will not ignite until raised far above any temperature to which they would be ordinarily exposed on land or at sea in the temperate or torrid regions of the globe.

Neither are they liable to combustion by handling or friction. I am happy, therefore, madam, in congratulating you not only on the beauty and brilliancy of your "night signal lights," but also on their durability and safety.

I have the honor to be, madam, your obedient servant,

R. OGDEN DOREMUS, *M. D., Prof. Chemistry in N. Y. Med. College, College of Pharmacy, Long Island College, Hospital, &c., &c.*

Mrs. MARTHA J. COSTON.

NAVY DEPARTMENT,
January 14, 1861.

SIR: In further response to the resolution of the House of Representatives of the 9th instant, I have the honor to communicate herewith copies of reports and other papers from the files and records of this department in relation to the "Coston telegraphic night signals." The reports are very favorable, and the experiments with the signals have been very satisfactory. The department is of opinion that great advantages would result from the introduction of the signals into general use in the navy.

I am, very respectfully, your obedient servant,

I. TOUCEY.

Hon. WM. PENNINGTON,
Speaker of the House of Representatives.